THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

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Locomotives And Autos Use Much Cast Iron

Schneidewind Gives Technical Talk; Noted Economist Predicts Good Business for 1940

By George J. Hales

Cleveland Chapter — Approximately 350 members turned out on Jan. 8 to enjoy a most interesting and educational discussion of cast iron by Prof. Richard Schneidewind, as well as a coffee talk by Russell Weisman, business analyst of the Cleveland Plain Dealer.

Mr. Weisman's talk was encouraging. He brought out that there has not been and probably will not be an appreciable war boom.

Among the many factors responsible are: The fact that foreign countries are now on a "cash and carry" basis; that they are not allowed to float loans in America unless their credit is good; that they have been preparing for this war for many years; and that it is largely a diplomatic war of nerves.

Business will continue at a good pace during the beginning of 1940, and will undoubtedly pause in its stride about the middle of the year to watch the political developments in this country. From this point on our business will probably be determined largely by the political situation.

Professor Schneidewind of the University of Michigan, in his talk on cast iron, stated that over 12,000,000 tons

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Design of Two Types Of Welds Discussed

By Anthony C. Kowalski

Worcester Chapter—At a joint meeting with the American Welding Society, Charles H. Jennings of the Westinghouse Research Laboratories spoke on "Welded Design".

Mr. Jennings stated that the designer of a welded structure should be familiar with *(a)* the physical properties of the welded joints and parent metal, *(b)* the methods of calculating stresses in welded joints, *(c)* working stresses and safety factors, *(d)* shop facilities and *(e)* methods of test.

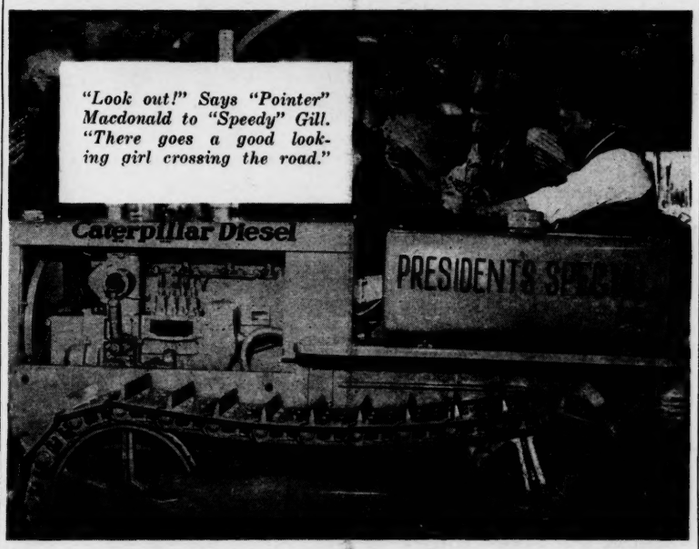
There are two fundamental types of welds—the fillet weld and the butt weld. The fillet weld generally requires a minimum of plate preparation but because of its inherent design produces points of stress concentration. Proper weld design makes allowance for these stress concentrations.

Butt welds require more preparation but they produce fewer stress concentration points. They permit the use of large electrodes with a corresponding increase in welding speed and reduction in welding costs.

Mr. Jennings recommended the following rules for welding design:

1. Use minimum number of parts to reduce the amount of welding.
2. Do not make welds larger than necessary to carry the required loads.
3. Design around shop equipment to eliminate unnecessary expense in assembling and welding.
4. Use intermittent welds to reduce cost and distortion.
5. Avoid rigid joints.

President Gets Tractor Lesson in Peoria



"Look out!" Says "Pointer" Macdonald to "Speedy" Gill. "There goes a good looking girl crossing the road."

President and Secretary Follow "Big Chautauqua" With Visit to West Coast

The men with their hats on backwards in the photograph above are National President James P. Gill at the controls, and Peoria Chapter Chairman John A. Macdonald, chief tool design engineer for Caterpillar Tractor Co.

This little lesson in tractor driving was an unexpected treat to President Gill on his recent visit to the Peoria Chapter.

In spite of the rolled-up shirt sleeves, the photograph was taken during January when the President and Secretary Eisenman traditionally don their long red flannels and make the "Big Chautauqua" circuit (North West-Milwaukee-Notre Dame-Chicago-Peoria).

Messrs. Gill and Eisenman are currently touring the far western Chapters and later in the spring will make many other "Little Chautauquas".

Those Chapters who have yet to hear President Gill's address on "Twenty Years of Tool Steel Metallurgy" may have their appetites whetted by the following quotation from a letter to Mr. Gill written by G. K. Dreher, chairman of the Milwaukee Chapter:

"Your lecture was filled with usable facts which can be applied to the every-day practice of many of our members. It is not often that so much information is condensed into a single evening.

"Judging from your method of delivery at our particular meeting, I have no doubt but that you will weather the long siege of speaking throughout this winter and spring season without breaking down. Thirty-five lectures is a stiff program for a politician with nothing whatever to say, let alone for a man who has a message such as yours and has to conduct his other business as well.

"Milwaukee was indeed fortunate to be included in the above number. I wish to express our sincere thanks for a very instructive evening".

Technical Papers Invited

All members of the Society are cordially invited to submit technical papers to the Publication Committee for its consideration for presentation before the National Metal Congress in Cleveland next fall.

Papers should be sent to the National Office in Cleveland to the attention of Ray T. Bayless, assistant secretary, American Society for Metals, not later than June 20, 1940. Prior notification of your intention to submit a paper is desirable.

Williams Is Lecturer for Tri-City Educational Course

The opening meeting of the educational course being presented by the Tri-City Chapter on "Heat Treatment of Steel" was one of the largest gatherings of the Chapter in several years. Held on Jan. 30, it attracted an attendance of 160.

Gordon T. Williams, past chairman of the Cleveland Chapter, who recently moved to Moline as metallurgist for Deere & Co., is presenting the lectures. The schedule is as follows:

Jan. 30—Equilibrium in Iron-Carbon Alloys.
Feb. 6—Effect of Cooling Rates.
Feb. 20—Hardenability.
Feb. 27—Effect of Alloys.
Mar. 6—Annealing and Normalizing.
Mar. 19—Quenching and Tempering.
Mar. 27—Case Hardening.

Talk on Refractories Covers Firebrick and Insulation

By L. J. Strohmeyer

Rockford Chapter—At the January meeting J. D. McCullough of Babcock & Wilcox Co. of New York delivered a very interesting talk on "Refractories".

Mr. McCullough covered in some detail both hard firebrick and light weight insulating refractories. He briefly outlined applications of both and illustrated his talk with slides.

Mr. McCullough pointed out that up until a few years ago only heavy firebrick was available. However, with the advent of the light weight insulating refractories some radical changes have occurred in furnace construction with improved operating efficiency.

He emphasized the ease with which this light weight brick can be worked as well as its low heat conductivity and heat flow.

Cost of Steel Is 20% of Price 60 Years Ago

John Johnston Points Out Many Other Trends in Growth of Steel Industry and Research

By Randall J. Salzer

Rochester Chapter—"Trends of Research in Metallurgy" was the subject of the talk given by Dr. John Johnston, director of research, U. S. Steel Corp., before a joint meeting with the Superintendents and Production Managers Group at the Rochester Chamber of Commerce on Jan. 8, 1940.

Dr. Johnston stated that 100 years ago, the steel industry was relatively small, showing no notable increase until after the invention of the steam engine.

After the bessemer and open-hearth processes were introduced, the industry grew rapidly in volume and efficiency, so that today the cost of steel is approximately 20% of the price of that 60 years ago. The average yearly consumption of steel is approximately 9 tons per person.

The increase in use of modern labor-sparing machinery and equipment is one of the things responsible for the increase in steel production; however, with the gradual reduction in supplies of high grade ore, the increased use of the less rich ores may increase the amount of labor.

There are far too many steel specifications in industry, according to Dr. Johnston, and *analysis* is not the sole determining factor in securing definite physical properties. This was emphasized by slides showing a variety of structures, all having the same chemical analysis.

A few of the highlights of Dr. John-

(Continued on page 7)

Compliments

To A. S. M. Vice-President **Oscar E. Harder**, assistant director Battelle Memorial Institute, on his selection to deliver the 14th annual series of Priestley Lectures at Pennsylvania State College March 11 to 15.

To **Frank T. Sisco**, editor, Alloys of Iron Research of the Engineering Foundation, and **Edmund M. Wise**, metallurgist, Research Laboratories, International Nickel Co., Inc., on their election as respective chairmen of the Iron and Steel Division and the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers.

To Carnegie Tech's **Robert F. Mehl**, elected vice-chairman of the Mineral Industry Education Division of the A. I. M. E.

To **E. A. Burr**, vice-president in charge of the Firestone division of Cleveland Quarries Co., on his election to the board of directors of the company.

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RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

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National Office Is Given Rare Volume for Library

A welcome addition to the archives of the American Society for Metals is a volume recently presented to the library at the national headquarters in Cleveland.

Donated by C. N. Dawe of Detroit, pioneer member of the early organization, it comprises a series of papers presented before the Steel Treating Research Club of Detroit in 1914 and 1915.

Still missing in the Society's library is the first volume of the *Proceedings* of the Steel Treating Research Society, which contains 12 numbers published during 1917 and 1918. Such a gift from some early member who has saved it through the years would be highly appreciated in the National Office.

"Bunny" Dawe was the first editor of the *Proceedings*, while A. F. MacFarland and Phil C. Huntley edited the two volumes of the *Journal* of the American Steel Treaters Society that appeared before the two organizations merged to form the American Society for Steel Treating (now the A.S.M.).

Bain's Book Adopted as University Textbook; Six Chapters Use His Course

E. C. Bain's recently published book on "Functions of the Alloying Elements in Steel" has been adopted by three universities as a text. They are Massachusetts Institute of Technology, State University of Iowa, and Lewis Institute in Chicago.

Lecture courses based on this book (and on the course presented by Dr. Bain himself during the National Metal Congress last fall) are also being given by the Syracuse, Dayton, Rochester, Buffalo, Oregon, San Francisco, and Los Angeles Chapters of the Society.

The latter two Chapters will have the privilege of hearing Dr. Bain present the course in person. He is making a special trip to the Coast for this purpose and will present the lectures on five successive nights in each city.

The first meeting of the Dayton course was held on Jan. 31. At that time S. R. Prance, general chairman of the Educational Committee, outlined the scope of the course, and R. R. Kennedy, metallurgist, Wright Field, spoke on "Fundamental Characteristics of Steels". The course is scheduled to be given on successive Wednesday evenings until completed.

Dr. Holt Treats York To an Evening of Salt Baths on Dec. 13

By A. Floyd Whalen

York Chapter was given a very educational and entertaining evening on Dec. 13 by Dr. D. A. Holt of the Niagara Falls plant of the DuPont Co. His subject was molten salt baths and the amount of research work he presented was not only news but a surprise to all present.

Dr. Holt presented his subject under three heads:

1. Case hardening salts. These were further divided into three kinds —plain cyanide, energized and accelerated.

2. Heat treating salts include *(a)* quenching and tempering salts, *(b)* hardening and annealing salts, *(c)* high speed hardening salts.

3. Heat coloring salts and solutions.

His paper would be a valuable reference work for any metallurgical library, and cannot be fully reported here. Only a few highlights can be given.

Sodium cyanide is the active principle of all commercial case hardening baths. It is made by modern synthetic methods from common salt, charcoal and air.

The chemistry of the bath was explained by reactions showing the role of oxygen in the case hardening reactions and the mechanism of the liberation of both nascent nitrogen and carbon.

The energized and accelerated type baths are more potent carburizers, since they have an added source of active carbon.

Carbon and nitrogen gradients determined by analysis of 0.004-in. cuts (on radius) showed that nitrogen is responsible for much of the hardness developed in plain cyanide bath cases.

It was pointed out that the so-called "neutral" heat treating salt baths decarburize steel due to the fact that they dissolve iron oxide which acts as the oxygen carrier. Oxide forms on the pot walls above the salt level and is fluxed off by the salt.

Racks and fixtures which are periodically exposed to the air and further oxidized when water quenched are another source of oxide contamination.

Rectifiers such as borax or boric acid are added to the bath to flux out the iron oxide. The iron borate scum and sludge must be removed by means of a perforated ladle at least twice each shift if the operator expects to maintain the bath "neutral".

Our thanks go out to Dr. Holt for a fine evening and to the DuPont Company who made his labors possible.

National Metal Congress & Exposition
Cleveland, Oct. 21 to 25, 1940

Course Covers 3 Subjects

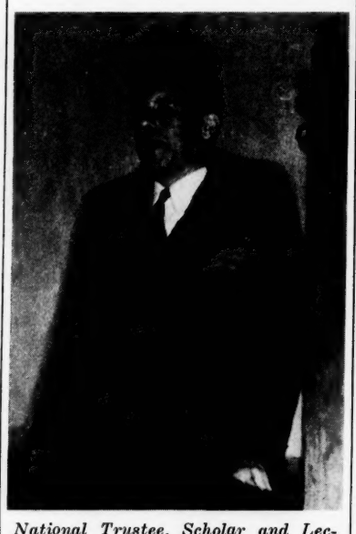
Three main subjects are covered in the educational program of the Detroit Chapter. All lectures are held at the Chemistry Arena of the University of Detroit.

During January the subject of "Plastics" was presented in two lectures by W. B. Hoey, development engineer for Bakelite Corp.

On Jan. 29 and Feb. 5 H. B. Vincent, research physicist, University of Michigan, spoke on "Metallurgical Analysis by the Spectrograph".

Two more lectures are scheduled for Feb. 19 and Feb. 26. Presented by Corey M. Van Fleet, development engineer for Eastman Kodak Mfg. Corp., they will be on the subject of "Color Photography".

Grossmann at New Jersey



National Trustee, Scholar and Lecturer Extraordinary, Marcus A. Grossmann, at New Jersey Chapter, Pompadour, Chest Microphone and All (Photo Taken at Chapter Meeting Held Last Nov. 20 by W. L. Hults)

Inter-Chapter Meeting Set

The Fourth Biennial Inter-Chapter Meeting of the A.S.M. will be held at State College, Pa., May 3 and 4. The region covered by the meeting includes the Philadelphia, Pittsburgh, Lehigh Valley, York and Southern Tier Chapters, but other members who are interested in the program are cordially invited to attend.

On Friday, May 3, two well-known speakers will talk on "High Temperature Alloys", and on Saturday morning two authoritative papers will be presented on "Hardenability of Steel".

An informal dinner and entertainment will be held on Friday evening, at which Walter Mathesius, vice-president of U. S. Steel Corp., will speak. Members are again indebted to C. W. Heppenstall for bearing the expenses of the entertainment.

Full details of the program and speakers will be given in a later issue.

R. I. January Thaw Uncovers New Talent

By Walter M. Saunders, Jr.

Rhode Island Chapter—As decreed by tradition, the mid-winter party was again a "January Thaw," held on the 12th. About 150 members and guests made the journey from nearby towns and hamlets scattered through New England.

The justly renowned Rhode Island Quartette was in fine voice, and ready and willing to entertain with selections ranging from hymns to grand opera.

Accompanying the Quartette is no mean job, but surprising talent was uncovered in the piano teams of Merle Caruthers and Vin Roddy, with Penny Pendleton on deck to rush into the fray when either showed any signs of weakening.

During a slight intermission, a turkey dinner selected by that connoisseur, Doc Rigdon, was served; for those more interested in sea-food, Neil MacLaren, a close second to Doc as a gourmet, offered broiled sword fish.

Then, before the irrepressible quartette got going again, Chairman George Gregson announced a floor show, which turned out to be much above the style to which the Chapter has become accustomed.

All in all it was a successful "thaw".

Double Feature Gets Crowd at Joint Meeting

Woodside Movie, Talk on Ford Tractors Given at Detroit A.S.M.-A.F.A. Meeting

By Walter G. Patton

Detroit Chapter—Those in the vicinity of the Fort Shelby Hotel on Monday, Jan. 8 probably observed the largest crowd of metallurgists, technicians and men engaged in allied pursuits that has been assembled in the Motor City for an iron and steel meeting in a number of years. The occasion was the joint gathering of the American Foundrymen's Association and the A.S.M.

The double feature that brought out the crowd was Bill Woodside's talking picture, "Panorama of Alloys in Steel" and a discussion by Claude Jeter on "Cast Steel Parts for the Ford Tractor". This paper was prepared by R. H. McCarroll and Mr. Jeter of the Ford Motor Co.

Mr. Woodside prefaced his talk with a few well-chosen remarks to his many Detroit friends and then proceeded to show on the screen a number of slides picturing the earlier types of heat treating equipment employed in this country.

Old Pictures Shown

Of particular interest was a group picture showing those persons present at the making of the first heat of vanadium alloy steel in this country at United Alloy Steel Co., Massillon, Ohio. Among those easily distinguishable in the photograph are Henry Ford, Fred Griffiths and the late J. Kentsmith, who are well known to A.S.M. members.

Mr. Woodside's picture, "Panorama of Alloys in Steel", depicting the history and development of alloy steels, has already been covered in previous issues of THE REVIEW.

In presenting Mr. Jeter to the group, Fred Walls, technical chairman, pointed out that for many obvious reasons foundry developments at the Ford Motor Co. are a subject of particular interest.

It probably came as somewhat of a surprise to Mr. Jeter's audience to learn that 1155 lb., or more than 50% of all the parts in the new Ford tractor, are cast metals, and of this more than 550 lb. are gray iron. The remaining castings are malleable iron (173 lb.) non-ferrous (48 lb.) and steel castings (381 lb.).

Fuel Consumption Reduced 50%

As proof of the economy of such widespread use of cast materials, Mr. Jeter pointed out that the Ford tractor weighs 2100 lb. as compared with 4000 lb. for other tractors of comparable capacity. Fuel consumption on the Ford tractor, the speaker said, is about 50% that of the heavier design.

Mr. Jeter then used slides to show actual casting operations in the Ford plant.

Among other things, the speaker pointed out that the Ford Motor Co. has now produced more than 5,000,000 cast crankshafts and 24,000,000 pistons.

While many foundry details including such items as type of mold used, pouring temperatures, spectrographic analysis, and fluidity, were discussed by Mr. Jeter, these subjects cannot be dealt with in detail in this report. Readers will be interested to learn, however, that even in these vast operations at the Ford foundry, rejects consistently run less than 2% and recovery for the centrifugally cast products averages in the neighborhood of 90%.

200 Chicago Members Attend President's Night on Jan. 11

A Long Line-up of Past and Present National and Chapter Officers Graced the Head Table on President's Night

Chicago Says "Ditto" to Reports of Other Chapters

By W. F. Carter

Chicago Chapter — January 11 was "President's Night", attended by over 200 members of the Chapter, and graced by the presence of National President James P. Gill and Secretary W. H. Eisenman.

The ability of these gentlemen in their respective lines of lecturing and entertaining has been so aptly reported by others that the present writer can find no superlative which has not been over-worked already. The Chicago Chapter wishes merely to say "Ditto" to all the nice things that have been said. The members and guests who attended feel that the January meeting was one of the high spots of the current series of monthly meetings.

The Chapter also wishes to express its thanks to O. W. Eshbach of Northwestern University for his talk entitled "Modern Concepts of Technical Education". Dr. Eshbach outlined the plans for the new School of Engineering at Northwestern which is to be operated on a cooperative basis.

Shown in the photograph of the head table are, left to right: Arthur Clarage, past national treasurer A.S.M.; H. A. Anderson, past chairman, Chicago Chapter; National Secretary W. H. Eisenman; Paul M. Steiert, technical chairman of the meeting; A.S.M. President James P. Gill; H. S. Van Vleet, chairman of the Chapter; O. W. Eshbach, dinner speaker; and R. G. Roshong, vice-chairman.

Also at the head table but not shown in the photograph were O. E. Harder, vice-president A.S.M.; Elmer Gammeter, past chairman of the Chapter; M. A. Grossmann, also a past chairman; Ray T. Bayless, assistant secretary A.S.M.; A. S. Jameson, Chicago Chapter Executive Committee; and E. A. Terwell, secretary-treasurer.

Movie on "Glass Magic" Precedes Talk by Krivobok

By G. G. Wilcox

Hartford Chapter—January 11 was the date of an unusually good meeting. The pre-meeting dinner at the City Club was well attended. After the dinner a movie by Bausch and Lomb Optical Co., entitled "Glass Magic", was shown, and aroused much interest.

The lecturer of the evening, Dr. V. N. Krivobok, offered an absorbing discourse on "Stainless Steels", and had no difficulty in holding his audience for nearly 2 hr.

Rather than a lecture on the general nature and properties of stainless steels, Dr. Krivobok attempted with great success to present from the consumer's point of view a number of difficulties, with their solutions, which are or may be encountered in fabrication and use of stainless products. These factors were effectively tied in with theoretical considerations.

Since Dr. Krivobok's address has been given before other Chapters of the Society, it will not be reviewed in detail at this time.

First of Two Meetings on Protection of Metal Surfaces Covers Paint and Enamel

By H. Thomasson

Ontario Chapter got away to a good start for 1940 by holding the first of two scheduled lectures on the "Protection of Metal Surfaces" in Toronto's Royal York Hotel, on Jan. 5.

This meeting was devoted to protection by non-metallic coatings and the subject of vitreous enamels was presented by A. E. R. Westman of the Ontario Research Foundation, while his colleague from the same organization, O. J. Schierholtz, dealt with paints as a means of protecting metals.

Dr. Westman described vitreous enamel as a glass that can be fused to metal by the use of suitably high temperatures. Like glass, it has the advantage of stability and permanence combined with some undesirable fragility, which recent developments have largely elminated.

Three classes of vitreous enamels are commonly produced—regular, for indoor service; weather resistant, for outdoor use; and acid resistant. Enamels are available for the chemical industry that will resist either strong acids or strong alkalies, but as yet, a high resistance to both is not available in any one enamel.

Most enameled work carries three coats—a dark ground coat whose function is to adhere tightly to the parent metal, and two finishing coats of the desired color.

Thinner and thinner enamel coatings with consequent greater adherence are being developed in order to overcome chipping troubles. The latest thing is a new enamel that, for certain types of ware requires only one cover layer over the ground coat to achieve the desired color.

Another interesting development is the introduction of a new low heat firing enamel which fuses at 1200° F. instead of the usual 1500 to 1600°. This has reduced warpage and made possible the enameling of large, thin sections.

Mr. Schierholtz then spoke on "Protection by Paints". Two factors are predominant; one is the preparation of the surface to receive the paint, the other the uniformity and balance of the paint.

Surface preparation involves obtaining a surface that is both chemically clean and stable, while paint uniformity requires the uniform dispersion of each ingredient throughout the mass.

Important for maximum service is the presence in the ultimate particle (or molecule) of the vehicle of certain carbon-oxygen groupings for which the metal has a strong chemical attraction, and which tend to orient themselves along the metal surface. By balance is meant the best proportions of pigment, vehicle and driers.

Factors which cause paint film failures were listed as sunlight, especially the invisible portion of the rays; rain, which washes out soluble matter, abrasion by wind-borne particles of sand and grit; lack of adhesion; unduly rapid chalking, which permits a washing away of pigment particles; and the uneven expansion or contraction of the various layers.

There are two classes of accelerated tests. One involves the use of weathering machines, which require from three weeks to six months to produce failure, depending on the nature of the finish.

The other class consists of rapid break-down tests, usually electrical in nature, which give results in only a few hours. Because such tests do not permit the normal hardening of the film (gradual aging probably promoted by strong light) before break-down sets in, they are not so reliable.

Notre Dame Meeting Sets All-Time High

By F. H. Craven

Notre Dame Chapter—While "National Officers Night" is always the high point of the program and is looked forward to with great anticipation by all members, the meeting this year set an all-time high for these affairs.

On Jan. 10 President James P. Gill, accompanied by Bill Eisenman and Ray Bayless, appeared before an audience of 250 members and guests of the Chapter assembled in the Engineering Auditorium of the University.

Our ever-genial secretary, Bill Eisenman, led off for the president and effectually thawed whatever ice there might have been, although he left Mr. Gill somewhat on the well-known spot with a few of his remarks.

Following the secretary, Mr. Gill gave one of those thorough, understandable and interesting talks for which he is noted. (It is interesting that we have added several tool men to our membership since his talk.)

During the year 1939 the Notre Dame Chapter has continued its steady and healthy growth. We now have 70 members and juniors, while our list of 11 sustaining members indicates the strong support we are receiving from the industrial and educational institutions of the community.

Rockford Has Bates Course

On Jan. 11 the members of the Rockford Chapter enjoyed the first of a series of eight lectures. The course covers production of pig iron, methods of steel making and the heat treatment of steel preparatory to final use.

It is based on the course entitled "Fundamentals of Ferrous Metallurgy" prepared by A. A. Bates and made available to Chapters by the National Office.

C. R. Wiggins of Northwestern Steel & Wire Co., Sterling, Ill., is acting as lecturer and instructor. He has been doing a wonderful job in keeping the men very much interested.

The original enrollment of about 60 has now increased to about 80.

12 Former Chairmen Observe Founding of Canton-Mass. Chapter

Past President Woodside and Early Organizers Speak

Canton-Massillon Chapter observed its founding in 1927 at a meeting Jan. 12 in the Onesto Hotel, Canton.

Guests of honor included 12 former chairmen of the organization, each of whom received a certificate of recognition from Wilbur Bischof of Timken Roller Bearing Co., present chairman.

They were: Martin H. Schmid of Massillon, first chairman; E. C. Smith of Cleveland, L. D. Gable of Canton, R. G. Roshong of Chicago, R. L. Wilson of Canton, Robert Sergeson of Pittsburgh, W. G. Hildorf of Canton, H. L. Deuble of Canton, T. J. Black of Irvine, Pa., L. L. Ferrall of Detroit, C. H. McCollam and W. J. Beuchling, both of Canton.

The main talk was presented by W. P. Woodside of Detroit, vice-president of Climax Molybdenum Co. and co-founder and past president of the A. S. M., who reviewed the development of alloy steels in the last 40 years.

Illustrating his talk with slides, he showed a picture of the first heat of alloy steel ever made in an open-hearth furnace. It was poured at the old Central Steel Co. plant in Canton about 1900, he said.

He also showed the motion picture, "A Panorama of Alloys in Steel", which was extremely interesting.

Talks also were made by L. D. Gable of Timken Roller Bearing Co., chairman of the Chapter's organizing committee in 1927, and Martin H. Schmid of Republic Steel Corp., Massillon, first chairman.

Indianapolis Leader Gives Course on Physical Testing

"Physical Testing" is the subject of the educational course currently being given by the Indianapolis Chapter of the Society under the capable direction of Chairman Robert L. Heath, metallurgist, Allison Engineering Division of General Motors Corp., who is also acting as lecturer. The material for the course is taken from sections of the 1939 edition of A.S.M. Metals Handbook. Dates and subjects are as follows:

R. L. Heath

Jan. 29—Enrollment and Introduction to Basic Considerations in Testing.
Feb. 5—Tensile, Bending, Hardness and Notched Bar Tests.
Feb. 12—Demonstration of Testing Equipment.
Feb. 26—General Discussion of the Application of the Results of Physical Tests.
Mar. 4—Fatigue Testing. (K. N. Krouse will discuss and demonstrate the fatigue testing equipment of Krouse Testing Machine Co., Columbus, Ohio.)

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Forum on Quality Control Held

By P. E. Nixon

Peoria Chapter—At a "Local Chapter Forum" held on Monday night, Feb. 12, five different speakers gave their versions of "Quality Control".

Starting with the melting of the steel in the open-hearth furnace the discussion carried through to the inspection of the finished part.

Although the speakers' time was brief, each gave a clear, concise picture of the many phases of this subject.

Factors Contributing to a Chapter's Successful Activities

Two talks that were presented as part of the program at the Chapter Chairmen's Breakfast during the National Metal Congress last fall. Mr. Beckwith and Mr. Knapp represent the viewpoint of a large and small chapter respectively.

By B. B. Beckwith
Chairman, Detroit Chapter

In order for any function or enterprise to be termed a success, it must appeal to a good percentage of those for whom it is planned. After a group of individuals have devoted a considerable amount of time and effort to planning a function, it is very disappointing to have only a few turn out, or have it fall flat for lack of interest.

With the A.S.M. this is particularly true. There are few groups who are quicker to criticize or tear apart anything that displeases than the average A.S.M. group. Composed as each Chapter is of plant executives, chief metallurgists, metallurgists, heat treat foremen and operators, salesmen (some technically trained and others not), engineers, both plant and designing, young men just out of college and starting their careers, it is very difficult to plan any one activity that will appeal to all members.

It is therefore necessary, especially in a large Chapter, to plan the various activities in such a way that each member will be attracted by at least one of the functions during the year.

The principal activities of the Chapters consist of *(a)* technical meetings, *(b)* educational programs, *(c)* social meetings, and *(d)* non-technical meetings. In addition to these there may be other interests such as a bowling league or golf tournament.

So that each activity may have as wide an appeal among the members as possible, the committees planning these separate functions should be selected with care. They should be made up of men who represent a cross-section of the types in the Chapter, but size should be kept down.

It is extremely important to include the younger men on committees because they often approach an old problem with a fresh viewpoint and enthusiasm. Also they must be brought along to provide executive material for the Chapter a few years hence.

A few thoughts on the subject of technical and educational programs gleaned from the experience of the Detroit Chapter might be useful. In making up the technical program, the groundwork consists of one "highbrow" lecture, one practical talk, and one non-ferrous lecture. The rest of the meetings are then set by discussion of the committee members taking into consideration comments and suggestions made by card ballot to the Chapter membership.

Highbrow Lectures Popular

While the "highbrow" lecture may be over the heads of a good percentage of those listening, nevertheless these same men will be back next year for another dose of the same thing. This meeting has come to be one of the largest in attendance of the technical meetings.

(By a "highbrow" lecture I mean a highly technical talk on theoretical metallurgy or structure of metals, based on the latest research work by metallurgists or physicists.)

Acting on the experience of the technical meetings, the Educational Committee last year decided to go "highbrow". The course finally settled on was one that might be called a graduate course for those who have been out of academic touch with the sciences for 15 to 30 years, on "Physics of Solids".

Previous courses dealing with practical problems and elementary metallurgy attracted an attendance of only 25 to 60. An exception was a course on spectrographic analysis and X-ray which was attended by nearly 400.

It was with some trepidation that the course in pure science was announced, but when 100 men came out for the first lecture (most of them 15 to 20 years out of college) our fears were allayed. There were three men who drove 120 miles each way to attend and 12 to 15 drove 60 miles each way. This type of educational activity seems to appeal to the older group as well as the younger, and we certainly intend to follow it up.

Now that the activities pertaining to the "promotion of the arts and sciences connected with either the manufacture or the treatment of metals, or both", have been touched upon I will discuss some other phases of Chapter activity. We are all familiar with the adage "All word and no play makes Jack a dull boy". The same thing holds true with a technical society.

All the joviality cannot be crowded into the time between the beginning of the dinner and the technical talk at the monthly meetings. Therefore, to provide an opportunity for the group to get together on a social plane, an evening or day, or both, set aside for entertainment or sports should be an essential part of a Chapter program.

Selecting a Social Committee

The entertainment or social committee handling this activity should be selected with extreme care from the major types making up the Chapter membership. If possible, there should be an executive, a sales representative, an older member (measured in service to the Chapter) and a newer member.

It should be large enough so that the work can be divided up and not be burdensome for any one individual. There can be no set pattern for all Chapters, the type being determined by the majority of members. The mid-winter party is usually confined to an evening and can have many variations.

A "Monte Carlo" night is one that has been tried and found successful. The committee rents a hall or room and secures as many types of gambling devices as possible. Each member receives $1,000.00 in stage money on entering. Prizes are awarded according to skill (or luck); the one with the biggest roll at the end of the evening receives the grand prize.

Another plan is to take over a night club for the evening. The management closes it to all except A.S.M. members and their guests. A dinner is served followed by the regular floor show, often augmented by several numbers secured by the committee. This party can be varied by substituting several boxing matches or wrestling bouts for the floor show.

The spring or summer outing at present is built around golf. For those who do not care for golf, horseshoes, baseball and other contests are arranged. The main idea in this party is to provide a place for the gang to get together and be boys again. They can have horseplay and raise Cain in general, for they are among friends and have all outdoors to roam in.

Ladies' Events

In addition to these stag social events, many Chapters have dinner dances that are highly successful. There is no better way to get away from technical discussion, but in the past, dinner dances have not proved popular in Detroit.

Instead the ladies are invited to attend the first meeting in the fall. This is held on the evening of the day Michigan and Michigan State meet on the football field at Ann Arbor.

We have a block of seats at the game, have our dinner at the Michigan Union and for the meeting have a professor from the University, outside the Engineering Department, give a talk on a non-technical subject. This meeting has received a large number of favorable comments.

In summing up, if your Chapter desires a well-rounded program, try the following suggestions:

1. Take a census of the membership as to technical and social interests.
2. Appoint committees in which each type is represented.
3. See that the final program is such that at least one activity during the year will particularly appeal to each type.

If the foregoing thoughts are borne in mind, the Chapter will be successful and the membership will grow steadily and stay with it.

By James H. Knapp
Chairman, Los Angeles Chapter

We have found in Los Angeles that one of the factors most important for success in Chapter activities is to have members who will carry out assignments, when made.

The first requirement perhaps is Chapter officers who are interested and are willing to work for the Chapter. Most important, I would say, is not the chairman, but the secretary. Our experience has shown that an active and interested secretary is the greatest help a Chapter chairman can have, and a big factor in the success of Chapter activities.

Since I helped form the Los Angeles Chapter, some years ago, I have served in different capacities, and have had experience with many different types of chairmen and secretaries.

Always, the most successful years were when we had a chairman and secretary who would work, and who could get their executive committee to work also. Hard work is the secret of success in every line of endeavor, and Chapter work is no exception.

Best results are obtained, in my opinion, when frequent meetings of the executive committee are held, and each committee chairman made to feel that he has a job to do, and is expected to get his committeemen to work.

The example of one or two very good men on the executive committee will act as an incentive to the other chairmen, who may be slighting their duties.

Another factor which makes for successful Chapter activities is to try and make every member feel he has something to do. Work should be spread around, as far as possible, over the entire membership.

One of the most important factors, I believe, in making for a successful Chapter, is to have interesting and entertaining meetings, that move along smoothly, and do not drag out too long.

Because of our geographical distribution in Los Angeles, many of our members have to come from considerable distances and we have found it necessary to provide dinner meetings.

One trouble we have had has been to get reservations in, so that arrangements can be made for the dinner. We have often had as many as 20 or 30 men show up who have not sent in reservations, which, of course, makes it hard for the committee in charge.

This year our secretary started a stunt of offering a door prize, and all reservation cards postmarked before a certain day and hour, are eligible. At the meeting these cards are put together, and one drawn out for the prize.

At our last meeting we received 100 cards, all ahead of the deadline, and 105 men came to the meeting, so it looks like this might be a good suggestion for any other Chapter having the same difficulty.

After all is said, however, you come back to the fact that your Chapter's successful activities depend on the officers and the executive committee. They must be willing to work, and the entire membership must be willing to help when called upon.

National Metal Congress & Exposition
Cleveland, Oct. 21 to 25, 1940

Tatnall's Talk on Testing Is a Hit at Penn State

By John C. Conte

Penn State Chapter, on Jan. 11, heard F. G. Tatnall of the Emery-Tatnall division of the Baldwin-Southwark Corp. talk on "Physical Testing".

Mr. Tatnall, head of an organization which manufactures testing machines of all types, listed many of the properties of metals which are tested; among them are tension, creep, torsion, fatigue, hardness, impact, and corrosion.

He showed relationship between several of these properties and described the tests for each and their value.

The lively personality possessed by the speaker coupled with the pleasing informality of his presentation made a distinct "hit" with the large group in attendance.

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American Society for Metals

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Boston Chapter Honors Famed Member By Establishing Sauveur Memorial Night

Joseph Winlock Selected as First Sauveur Lecturer; Speaks on Sheet and Strip for Deep Drawing

By J. V. Baxter

Boston Chapter—Fully, indeed, has lived the man who leaves not only a splendid record of achievement in his field of endeavor, but also an indomitable spirit that carries on in the minds and hearts of all who knew him.

Such a man was our own Dr. Albert Sauveur. We, of the Boston Chapter, who were privileged to know and work with him intimately, cherish his memory and now strive to carry on the "Sauveur" tradition by an annual meeting dedicated to his memory.

Joseph Winlock
(Photo by A. L. Knight)

Joseph Winlock, chief metallurgist, Budd Mfg. Co., an intimate friend and student of Dr. Sauveur, was a fitting selection for the First Sauveur Memorial Lecturer held on Jan. 5, 1940 at M.I.T.

H. H. Lester introduced the speaker and presented to him a picture of Dr. Sauveur superimposed on a background of pearlite, an appropriate symbol of the occasion.

Mr. Winlock spoke on sheet and strip for deep drawing. He based his discussion on the premise that the manner in which the draw is accomplished is of equal importance to the physical properties of the steel itself.

The steel most widely used for deep drawing is a low carbon basic open-hearth steel usually of rimming type.

Hot Rolling Considerations

When hot rolling, if the temperature is above 1100° F. "spontaneous" annealing may take place, and prevent the occurrence of distorted grains in the metal when it has reached room temperature.

When steel is hot rolled to the lighter gages, the finishing temperatures on the hot mill are usually so far below the temperature at which spontaneous annealing takes place that a considerable amount of deformation is actually cold work. For this reason steel which has been rolled on the hot mill is often susceptible to grain size changes on subsequent annealing.

In the final cold rolling of strip steel where reductions are often as high as 60%, a final light pass, after annealing, called a "temper" or "pinch" pass is often made to reduce the tendency to "stretcher strains".

Stiffness Often Misunderstood

This tempering pass also increases the "stiffness", a property often misunderstood. Stiffness is sometimes thought of as being synonymous with rigidity and the incorrect conception is, therefore, obtained that cold rolling increases the resistance to deformation, which is not true. All steels whether they have been cold rolled or not, have the same resistance to deformation, i. e., the modulus of elasticity does not change appreciably.

In deep drawing, the elongation or stretching of a blanked or sheared edge is undesirable, because it produces cold work, decreases the ductility of the edge of the metal. Small tears start in the edge which develop into large cracks in the drawing operation.

In annealing for deep drawing both too large and too small a grain size must be avoided. A sheet having a large grain size will exhibit, after deep drawing, a coarse granulated surface known in the shop as "orange peel". This requires filing and polishing to obtain a smooth surface.

A steel having a large grain size is also more subject to "Stead's brittleness" which is caused by the crystalline grains assuming the same orientation. The steel may draw perfectly in a preliminary operation and then exhibit extreme brittleness in a subsequent operation in which the application of stress has been from a slightly different direction.

One of the greatest difficulties encountered in deep drawing is the occurrence of "stretcher strains." This condition is caused by the fact that permanent deformation does not take place in all of the grains simultaneously, but occurs suddenly at different points throughout the stressed areas.

If enough permanent deformation is given to the steel before the deep drawing process to cause all or most of the grains to slip partially, these "stretcher strains" will not occur during the subsequent deep drawing operation.

In practice the steel is given a roller leveling pass to produce the necessary amount of cold work. This is done immediately before the forming operation in order to prevent "aging".

Following the dinner a motion picture entitled "The Hurricane's Challenge" was shown through the courtesy of the New England Telephone and Telegraph Co.

This picture showed some of the havoc caused by the great storm in New England last year, and the heroic efforts of the telephone crews to bring the service back to normal after the devastating damage.

Long Discussion Indicates Interest in Microscopy

By S. J. Morgan

New Haven Chapter—J. R. Vilella of the U. S. Steel Corp. Research Laboratory gave an interesting talk at the Jan. 18th meeting, which was held at the Hammond Laboratory, Yale University.

R. M. Brick, professor of metallurgy at Yale, was technical chairman and introduced Mr. Vilella, whose subject was "Microscopy". Emphasis was placed on the importance of proper preparation of samples and some very fine lantern slides were used to illustrate the different processes and results obtained.

The length of the discussion period following the lecture showed the subject was one of great interest to the large number present at the meeting.

President Visits Milwaukee

By W. J. Resiner

Milwaukee Chapter—National President James P. Gill, metallurgist of the Vanadium-Alloys Steel Co., started off the new year with a talk on "Modern High Speed Steels".

Mr. Gill discussed chemical composition and the effects of varying the content of the alloying agents on the physical properties.

Manufacture, fabrication, and heat treatment were all thoroughly covered. It was one of the most educational lectures given this season.

That young man, Mr. W. H. "Bill" Eisenman, in an introductory address gave out a few details as to the history and workings of the Society, as well as a choice collection of his personally selected stories.

Gill Draws Best Springfield Attendance

Those at the Head Table at the Record-Breaking Springfield Chapter Meeting Seemed to Be Having a Good Time When This Photograph Was Snapped

By S. A. Epstein

Springfield Chapter—The snap reproduced above was taken by Candid Cameraman Arden L. Knight, chairman of the Boston Chapter. This particular meeting, the best attended in the history of the Springfield Chapter, was addressed by President Gill, who spoke on "Tool Steels".

National Secretary Bill Eisenman convulsed the audience with his stories and we think that in this picture he is being particularly amused by something he was either thinking of or telling the gentleman on his right.

Reading from left to right, the faces in the above picture belong to: Paul W. Oliver, chairman of the Educational Committee; Arthur L. Shields, technical chairman of the meeting; National President James P. Gill; Paul C. Farren, vice-chairman of the Chapter; National Secretary William H. Eisenman; and Allen J. Carruthers, Chapter secretary-treasurer.

National Metal Congress & Exposition
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Human Specification Interests Students in Lively Testing Talk

By Maier Gittlen

Michigan College of Mining and Technology Group—At a meeting on Jan. 31 Francis G. Tatnall of the Baldwin-Southwark Corp. gave a lively and up-to-date talk on testing heard by about 150 students and faculty members.

In a manner that was always vigorous and to the point, and with many a humorous touch, Mr. Tatnall discussed the results obtained from many different types of test including tensile, compression, flexure, torsion, impact, fatigue, corrosion, damping, creep, abrasion, and shear.

He emphasized the interpretation of results, explaining at considerable length the effect on a tensile test of speed of pull.

Mr. Tatnall tied up discontinuities at the yield point with slip and showed why roller leveling prepares sheet for drawing. The description of the testing of full-size or scale model structures with the aid of the civil engineer's tool, strain gages and stress analysis, was very interesting.

Human specifications set up by Mr. Tatnall were of special interest to students. In conclusion he said that engineering is young and developing along new lines, that testing of materials is of first importance to the engineer, and that engineering had for years been handicapped by lack of full understanding of materials.

The Michigan Tech A.S.M. is currently engaged in the construction of a snow statue patterned after the Vanadium Co.'s melter in co-operation with the annual Michigan Tech winter carnival scheduled for Feb. 14 to 17. The meeting planned for Feb. 21 is to be a beer bust.

Cites Savings of 30 to 70% Effected By Welding Design

By Charles F. Lewis

Texas Chapter—About 150 men attended the January meeting of the Texas Chapter on the 19th. The River Oaks Country Club did an unusually good job and bids fair to become the standard meeting place.

Because of the current cold wave the usual before-dinner beer keg was partially shunned—nevertheless, there was very little left for the late stayers!

In speaking on "Fusion Welding", James F. Lincoln, president, Lincoln Electric Co., took as his theme the thought that lower costs for wider distribution of structural and machine parts demand new methods of construction and new design. Welding is filling that need.

Samples of change-over design were shown and the point made that these still resembled cast parts in appearance. Mr. Lincoln attributed this to the same psychology that kept whip sockets on the early automobiles.

Great stress was laid on the large savings in the cost of the finished part that may be effected by welded design. Savings of 30 to 70% were cited, and the general average may be assumed to be in the neighborhood of 50%.

This may be further increased when the steel mills begin to roll shapes adapted to welded construction. Present shapes are a hangover from the days when flanges were required for riveting.

Mr. Lincoln also touched on the metallurgy of welding, pointing out the steps necessary to overcome the effects of the high temperature on the heated zone adjacent to the deposit.

Detroit A.F.A. Gives Course on Foundry

The Detroit Chapter of the American Foundrymen's Association will present a series of six lectures on "Fundamentals of Foundry Practices", starting on March 1 and continuing each Friday thereafter, in the Chemistry Lecture Room, University of Detroit.

The lecturers will be such prominent men in the foundry field as H. W. Dietert, H. W. Dietert Co.; V. A. Crosby, Climax Molybdenum Co.; Fred Weaver, Great Lakes Foundry Sand Co.; L. G. Korte, Atlas Foundry; Donald J. Reese, International Nickel Co., Inc.; John A. Linabury, Saginaw Malleable Co.; and Omer Allen, of Pontiac Motor Co.

The course has been arranged by the Educational Committee of the Detroit Chapter of the A. F. A. composed of the following: F. J. Walls, of International Nickel; A. L. Boegehold, Fred Melmoth, A. J. Herzig, A. Di Giulio, E. K. Smith, R. E. Schneidewind, and A. H. Allen.

Registration fees will be $1.50 for members whose companies are A.F.A. members, and $2.50 for non-members.

Helpful Literature — Mail Coupon Below

Mounted Wheel Chart

A convenient ready reference wall chart showing mounted grinding wheels should be of great advantage in the cleaning room, pattern shop, tool and die room, and many other places. It gives at a glance, by means of detailed drawings, actual size, the exact radius of each wheel and its exact shape. Chicago Wheel & Mfg. Co. Bulletin Bd-230.

Hardening Furnace

A new pamphlet which describes "Certain Curtain" furnaces made by C. I. Hayes, Inc., will be particularly interesting to those with hardening problems. Bulletin Nc-15.

Non-Sparking Safety Tools

If your work is near inflammable gases, explosives, etc., the new 20-page catalog featuring Ampco non-sparking safety tools will prove interesting and valuable. Ampco Metal, Inc. Bulletin Bd-175.

Collegiate Furnaces

A 12-page folder showing Ajax-Northrup furnaces in ten colleges with statements of uses in each by professors and graduate students is now available through the Ajax Electrothermic Corp. Bulletin Bd-41.

Dilatometer

The new Rockwell-Bristol Dilatometer which both indicates and records in ink time-dilatation changes and temperature-dilatation changes simultaneously during heating and cooling cycles is described in a folder released by the Bristol Co. Bulletin Bd-87.

Contour Sawing

A virtual text on Contour Sawing, containing over 300 illustrations in its 160 pages, is now available through Continental Machines, Inc. Bulletin Bd-170.

Tool Steel

"Ketos"—a tool steel for making intricate tools—is described in a new folder by the Crucible Steel Company of America. Bulletin Bd-56.

Structural Metal

A complete and concise discussion of magnesium and its alloys is contained in the booklet "Industry's Lightest Structural Metal" which is made available through the Dow Chemical Co. Bulletin Bd-215.

Heat Treating Hints

A helpful, colorful booklet edited by experienced heat treaters is available through the Lindberg Engineering Co. Bulletin Bd-66.

Rayotubes

Specialized temperature measuring problems to which Rayotube detectors are now being applied are shown in an impressive booklet released by Leeds & Northrup Co. Bulletin Bd-46.

Flame Gouging

An economical method of grooving steel, "Flame Gouging", is explained with operating data and illustrations in an 8-page folder released by The Linde Air Products Co. Bulletin Bd-63.

Machinability Chart

A quick and accurate picture of how Rustless stainless steel will respond to your shop operations is given in the "slide-rule" machinability chart available through the Rustless Iron & Steel Corp. Bulletin Bd-169.

Ferrocarbo

A cupola addition, "Ferrocarbo", which improves casting quality, lowers costs and reduces rejects is described in literature available through the Carborundum Co. Bulletin Bd-57.

High Temperature Fans

A 4-page illustrated bulletin on this subject has been released by Michiana Products Corp. The applications (where temperature requirements range up to 1800° F.) are enumerated and construction described. Stock sizes mentioned include fans up to 32,000 cubic feet per minute capacity. Bulletin Hb-81.

Moly in Steel

Metallurgists, engineers and production executives who are really interested in the metallurgy of steels and their application will want the excellent book on molybdenum steels published by Climax Molybdenum Company. Bound in loose-leaf manner, this reference book is chock-full of tables which form a volume almost an inch thick. Bulletin Hb-4.

Vacuum Cleaning

A very colorful brochure which illustrates modern cleaning methods by vacuum in industrial plants has been released by The Spencer Turbine Co. Bulletin Dc-70.

Lectromelt Furnaces

The story behind lectromelt furnaces is well told in this 48-page booklet issued by the Pittsburgh Lectromelt Furnace Corporation. Tells of development and recent improvements. Bulletin Db-18.

Specialized Tester

The Rockwell superficial hardness tester is a specialized instrument for use where the indentation into the work must be kept shallow or of small area, yet sensitivity preserved. A supplement to Wilson Mechanical Instrument Co.'s catalog on the regular Rockwell tester tells all about it. Bulletin Sy-22.

Ferro-Alloys

An interesting folder by Electro Metallurgical Co. tells all about their ferro-alloys and their special service to users which will help them to operate their furnaces and make alloy additions under the proper conditions. Bulletin Jy-16.

Char-Mo Atmosphere

A colorful folder explaining how molybdenum steel can be heat treated without decarburization is now available through the Surface Combustion Corporation. Points out advantages of the new Char-Mo furnace and explains its operation. Bulletin Lb-51.

Machining Steel

An 80-page book of general and specific information on steels, including tables of recommended cutting speeds and feeds for many grades of carbon, alloy and stainless steel, is available from the Union Drawn Steel Division of Republic Steel Corp. Bulletin Nc-8.

Fatigue Test

A complete description of the fatigue test as made on the R. R. Moore fatigue testing machine is given in a folder by Baldwin-Southwark Corp. Examples are discussed and illustrated. Bulletin Ka-67.

Pot Furnaces

The new features of American Gas Furnace Co.'s improved pot hardening furnaces include insulating refractory lining backed by block insulation, heat resisting alloy burners, single valve control, numerous small burners with their attendant advantages, burner location and method of venting. Fully described in Bulletin Sy-11.

Welding Stainless

How to weld stainless steels is described in a colorful 12-page folder released by the Page Steel and Wire Division of American Chain & Cable Co., Inc. Bulletin Cc-86.

Electroplating

A complete group of chemicals, processes and materials of interest to those engaged in electroplating is listed in this 8-page booklet published by the E. I. du Pont de Nemours & Co., Inc. Bulletin Eb-29.

Cr-Ni-Mo Steels

A. Finkl & Sons' catalog is really a technical treatise on chromium-nickel-molybdenum steels for forgings. Pocket size, 104 pages, cloth bound, illustrated by photographs, charts and tables. Bulletin La-23.

Laboratory Furnace

The Sentry Co. describes a high temperature tube combustion furnace. It permits operating temperatures up to 2500° F., thus offering greater speed and precision for combustion analysis or other laboratory procedures. Bulletin My-114.

Hydraulic Tester

Of interest to all engineers recommending or purchasing universal testing machines is a book by Riehle Division of American Machine and Metals, Inc., on the development of the precision hydraulic testing machine. Bulletin Ba-157.

No Back-Fire

A burner that cannot back-fire is described in a brand new booklet on the fuel equipment products made by the Eclipse Fuel Engineering Co. Bulletin Ad-226.

High Speed Steel

Required hardness and extraordinary toughness combine to make Firth-Sterling Co. new high speed steel "Mo-Chip" of unusual interest to manufacturers who need a steel that is "practically indestructible." Bulletin Ad-177.

Dust Collecting

Fourteen outstanding features found in Pangborn dust collectors, along with pictures of typical installations and savings, are found in the new Pangborn Bulletin. Bulletin Ad-68.

Heat Treating Furnaces

A brand new 16-page booklet of Holcroft & Company shows and describes their line of controlled atmosphere heat treating furnaces. Bulletin Ec-203.

Pickling Savings

Savings in the pickling department when Monel is used are shown in an illustrated folder just released by the International Nickel Co. Bulletin Ad-45.

Testing and Controls

An up-to-the-minute booklet on foundry sand testing and control equipment is just off the press. Published by Harry W. Dietert Co. Bulletin Ec-198.

General Data Book

Valuable reference and data are contained in a book by Joseph T. Ryerson & Son, Inc., which gives metallurgical definitions, heat, hardness, and numerical equivalent tables as well as many valuable operating facts. Bulletin Nc-106.

Design

Designing greater sales appeal into products is explained in a colorful 8-page booklet for anyone who contemplates using, or is using, Stainless Steel, issued by the Carpenter Steel Co. Bulletin Nc-12.

Portable Potentiometer

An extremely versatile indicating potentiometer with precise balancing, quick standardization, and easy-reading scales is described and illustrated in a new folder by the Foxboro Co. Bulletin Nc-21.

Bright Annealing

Various types of electric and fuel-fired furnaces built by the Electric Furnace Co. for bright-annealing wire, tubing, strip and other products are described in an 8-page folder. Bulletin Lb-30.

Cinch Steel Cement

How Cinch steel cement saves high speed steel and Stellite by permitting the using up of short pieces is told in a bulletin by Claud S. Gordon Co Bulletin Ka-53.

Chapmanizing

Chapmanizing, the method of surface hardening steel with nitrogen, is described in a very attractive booklet of Chapman Valve Mfg. Co. Information is given on the method itself and on its metallurgical advantages. Bulletin Ob-80.

High Tensile

The 19 advantages that USS Cor-Ten steel offers to railroads and other industries are attractively presented in a 68-page book on this new low cost, high tensile steel published by United States Steel Corp. Bulletin Ka-79.

Screw Machining

Screw machine products of aluminum are treated in authoritative and extensive manner in a booklet of Aluminum Co. of America. Besides general data on screw machining, a number of very useful tables appear. Bulletin Ar-54.

Ingot Production

"The Ingot Phase of Steel Production" is the title of a book defining the principles of quality ingot production followed by many well-known steel manufacturers. Gathmann Engineering Co. Bulletin Ka-13.

Heat Resisting Alloys

Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures, is contained in Bulletin D-17.

Electric Furnaces

A new catalog on electric furnaces and pyrometers has been released by the Hoskins Manufacturing Company. For anyone who does any kind of heat-treating, brazing, or uses heat-resisting castings. Bulletin Hc-24.

Pure Metals

Pure, carbide-free metals are described and applications suggested in a pamphlet published by Metal & Thermit Corp., who make pure tungsten, chromium and manganese in addition to the ferro-alloys. Bulletin Ma-64.

Heat Treat Chart

Heat treaters everywhere should find a heat treating wall chart complete with S.A.E. specifications a very valuable addition to their shops. Published by Chicago Flexible Shaft Co., manufacturers of Stuart industrial furnaces. Bulletin Ka-49.

Heroult Furnace

Revised and expanded to include modern major innovations in the construction and operation of the Heroult electric furnace, the latest edition of the American Bridge Co.'s Heroult Electric Furnace Bulletin is available. Bulletin Bb-124.

Seamless Tubes

Prepared by the Timken Steel and Tube Division of Timken Roller Bearing Co. is a "Guide for Users of High Temperature Steels" which presents technical data relating to the various properties of Timken seamless tubes. Bulletin Bb-71.

Ni-Cr Castings

Compositions, properties, and uses of the high nickel-chromium castings made by The Electro Alloys Co. for heat, corrosion and abrasion resistance are concisely stated in a handy illustrated booklet. Bulletin Fx-32.

Annual Index

The Annual Index of the Copper Alloy Bulletin published regularly by the Bridgeport Brass Company is now made available through this company. Bulletin Kc-163.

Low-Alloy Steel

A new folder on Mayari R, Bethlehem's high-strength, corrosion resisting steel, is colorfully illustrated with views of its various uses. Bulletin Kc-76.

Lubrication

Intensive research which completed important improvements in the field of heavy-duty gear and bearing lubrication is tabulated in a new 12-page illustrated bulletin just released by D. A. Stuart Oil Co., Ltd. Bulletin Lb-118.

Carburizing Salt

A technical service bulletin describing a new development—DuPont Carburizing Salt—for the economical production of deep high-carbon cases on plain carbon and alloy carburizing steels . . . available through DuPont. Bulletin Dc-29.

Colmonoy

The high resistance to wear and corrosion which distinguishes Colmonoy alloys and overlay metals is explained in a 4-page catalog released by Wall-Colmonoy Corp. Bulletin Bc-85.

Oil Burners

North American Mfg. Co. offers a bulletin describing improved low pressure oil burners, one type especially designed for automatic control and ideally suited for use with proportioning control valves. Bulletin Na-138.

Foundry Sand

A pamphlet recently issued on TAM Foundry Zircon Sand and TAM Zircon Flour contains detailed information on these products of the Titanium Alloy Mfg. Co. Bulletin Hc-90.

Metallographic Reference

Nearly one thousand technical books and reference papers on Optical Principles in Metallography are listed in the new Metal Analyst just released by Adolph I. Buehler. Bulletin Lc-135.

Tocco Process

The marvel of all heat treaters—the Tocco Process of Induction Hardening—is fully described in a colorful folder by the Ohio Crankshaft Co. Bulletin Lc-145.

The Review
7301 Euclid Ave., Cleveland

Please have sent to me without charge or obligation the following literature. (Circle the numbers that interest you. It is important to write in your company or business connection when you return this coupon.)

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						Fx-32	

Here and There With A.S.M. Members

MAURICE G. STEELE, secretary-treasurer of the Baltimore Chapter in 1937-38, and at present a member of the Meetings Committee, is leaving Baltimore for Rome, N. Y., as factory manager of the Kent Co.

Mr. Steele has been with Revere Copper and Brass Co. since 1929 and was stationed in Rome from then until 1935, as manager and chief engineer of the Rome Radiation Co. Division, and as product engineer with the research department. In the Baltimore Division he has been technical adviser to the sales department.

Mr. Steele graduated from Worcester Polytechnic Institute with a mechanical engineering degree in 1915. Before coming to Rome, he had held responsible positions with Automatic Refrigerating Co. of Hartford, Conn., and Hart & Hutchinson Co. of New Britain.

He served in the Ordnance Department of the U.S. Army in 1917-19, working on design of railway gun mounts, experimental firing, testing, and development work at Aberdeen Proving Grounds.

* * *

A MEMBER of the Buick Motor Division manufacturing organization for 28 years, and for the past six years superintendent of the sheet metal plant, HARRY HERRON has been named to a special assignment in connection with future die design and manufacturing development.

Harry Herron

Mr. Herron started as a mechanic on the motor assembly line in 1911. He became a foreman in the sheet metal plant in 1922, was made chief die designer in 1928, and became superintendent of the plant in 1934.

* * *

THE new and rapidly expanding Steel Division of the Copperweld Steel Co. at Warren, Pa., recently announced a new vice-president in charge of sales in the person of SIDNEY D. WILLIAMS.

With Timken Steel and Tube Division since 1926, Mr. Williams was successively metallurgical sales engineer, assistant director of sales, manager of tube sales, and director of sales.

He has been in the steel engineering and sales business ever since graduation from Lehigh University in 1913. Five years were spent in various departments of the Homestead Works of the Carnegie Steel Co. After serving in the United States Naval Flying Corps in 1918, he became superintendent of the open-hearth department of the Central Iron and Steel Co., and subsequently superintendent of the open-hearth department and chief metallurgist of the Pittsburgh Crucible Steel Co.

* * *

THE announcement of the opening of a commercial heat treating shop in the Newark area was recently made by FRANK R. MATHEWS and his son JAMES R. MATHEWS, to be known as The Mathews Co.

Mr. Mathews, who is past chairman of the Springfield Chapter (1924-25), brings to this locality a varied and thorough experience in all phases of the heat treatment of steel. For many years he was in charge of all heat treating operations for the Rolls Royce Motor Car Co. of Springfield, Mass., Chapman Valve Co., American Bosch Magneto Co., and Worthington Pump and Machinery Co. at Holyoke, Mass., and Harrison, N. J.

CHARLES H. ERICKSON, who had been vice-president and general superintendent of the Cleveland Wire Spring Co. for 21 years, died last December.

C. H. Erickson

Mr. Erickson, who was born in Sweden, had been in the manufacturing business since he was 14 years old, when he entered the plant of the old Washburn & Moen Co. in Worcester, Mass., one of the original American Steel & Wire Co. firms.

In 1900 he was sent to Waukegan, Ill., to start a new mill for American Steel & Wire Co., and later was transferred back to the South Works in Worcester.

He came to Cleveland in 1903 and joined the Cleveland Wire Spring Co. as superintendent. In 1918 he was elevated to the vice-presidency.

Two Lecturers Will Present Bates Course at Texas

Texas Chapter has announced Bates's course on "Fundamentals of Ferrous Metallurgy" for its educational work this season. Classes will be held in the library of the Houston Engineers Club each week beginning Feb. 29, with the exception of the regular Chapter meeting nights.

Dr. Alex Vallance, formerly head of the mechanical engineering department of Texas University, will conduct the first half of the course, with Charles F. Lewis, metallurgical engineer for Cook Heat Treating Corp., leading the last part.

The first group of four lectures will discuss the raw materials and the processing methods used in the production of ingot steel. The second group of four lectures concerns itself with the nature and properties of steel and the principles of its heat treatment.

Johnston Outlines Trends in Research

(Continued from page 1)

ston's talk might be mentioned here.

The "direct process" will not replace the blast furnace, at least for a long time, because of the high fuel efficiency of the latter.

Physical tests of today are merely conventional tests which are not a very good measure of the real properties of the metal. There are many things to be found out about metals which are not known today, and there is need for improvement in methods of test.

"Aging" is apparently a precipitation of something in the metal. In steel it is usually a nuisance, in aluminum a benefit.

There is a tendency to replace alloy steels with better made carbon steels. This was emphasized by the report that one of the newer automobiles uses little or no alloy steel.

The engineering trend today is toward lighter sections, necessitating stronger materials. Automobile fenders, for instance, are approximately half as thick as they were a few years ago. Consequently the corrosion factor must be considered, since the thinner the section, the greater the danger of undue weakening by corrosion.

Dr. Johnston forecast that metallurgical developments will continue to advance at an accelerated rate, and expects modifications but no radical change in the methods of producing steel in the near future.

Increase in Welding Lays New Demands On Low Alloy Steels

By Thomas E. Hamill

Washington Chapter—A joint meeting with the local chapter of the American Welding Society was held in December. Dr. A. B. Kinzel, chief metallurgist of the Union Carbide and Carbon Research Laboratories, gave a talk on "Low Alloy Steels for Welding", a subject of prime importance to both the welding engineer and the metallurgist.

With the development of welding and its many applications, the present-day low alloy steels must have weldability, better corrosion resistance, and higher tensile and yield strength with no loss of ductility.

A steel is considered as having weldability if it makes a satisfactory joint under the conditions in which it is used. The conditions are the welding methods, preheating or postheating, and whether the welding is done inside a building or out in the field.

In selecting the proper alloys and the correct amount to be added, the properties on air cooling after hot rolling and on cooling from the welding temperature must be considered. Many alloy steels are unsuitable for welding because they become too hard and lose ductility after air cooling from the welding temperature.

Carbon content is the controlling factor in ductility and should be kept below 0.15%.

Numerous examples were given showing how compositions of some of the present alloys were arrived at. In Cor-Ten, 1% chromium was added to a low carbon steel to increase its tensile strength but its corrosion properties were too low so phosphorus and copper were added. Silicon was then added to increase its yield strength, while increased ductility was obtained by lowering the carbon content.

Other high strength, low alloy steels were developed by using as the base such elements as nickel and manganese rather than chromium. Steels containing both manganese and carbon often have too much strength and not enough ductility. This effect may be neutralized by the addition of a strong carbide former such as vanadium.

In electric arc corner and fillet welding considerable trouble is often experienced with cracking and distortion because the rate of cooling is relatively rapid. In electric arc butt welding the rate of cooling is directly controlled by the size of piece used and much less trouble is encountered.

In oxy-acetylene welding the rate of cooling is less than in electric arc welding so that all the current low alloy steels are weldable by butt, corner or fillet welding.

In Unionmelt (slag cover) and pressure welding the temperature gradients are considerably less than the other two methods and all the steels are easily weldable.

In summarizing, Dr. Kinzel stated that an alloy steel to be almost universally weldable must *(a)* have a maximum carbon content of 0.14%, and *(b)* have no more than about 80,000 psi. tensile strength on normalizing.

The lively discussion which followed indicated that the talk was of great interest to both the metallurgist and the welding engineer.

Krivobok Visits Golden Gate

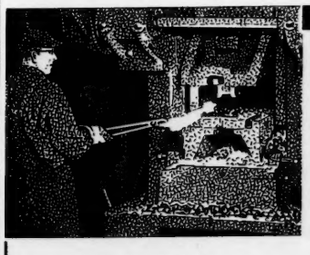
By C. L. Dornbush

Golden Gate Chapter—Following the practice instigated by Program Chairman John Parks of getting as many prominent speakers as possible, Dr. V. N. Krivobok of the Carnegie Institute of Technology and the Allegheny Ludlum Steel Corp. spoke to 100 members and guests at the December meeting.

Dr. Krivobok was undoubtedly one of the most entertaining as well as instructive among the many excellent speakers who have addressed the Golden Gate Chapter in the past year. His subject was "Stainless Steels", the field in which he is considered a leading authority.

A detailed account of his lecture has appeared in a previous issue of THE REVIEW.

National Metal Congress & Exposition
Cleveland, Oct. 21 to 25, 1940



FORGING HANDBOOK

by Waldemar Naujoks and Donald C. Fabel

This 630-page book is more than a handbook on forging methods and forgings. It is a valuable reference on forged metals—their proper use, physical properties and production records.

Problems in forging design—helpful to the design engineer, metallurgist, and production man—are discussed and illustrated by drawings and photographs.

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- Finishing Operations
- Heat Treatment of Forgings
- Cleaning of Forgings
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- Materials Handling
- Forge Plant Design
- Forge Plant Maintenance
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Cast Iron Is Useful In Many Applications Says Schneidewind

(Continued from page 1)

of iron castings have been sold in a year. Many automobiles carry over 400 lb. of gray iron in the cylinder block, brake drums and miscellaneous fittings. In locomotives the steam cylinder, pistons, piston rings and similar parts subjected to metal-to-metal wear are made of this material.

Gray iron is useful not only for bulk and weight, but also will surpass steel in many types of service. An all-steel brake drum will score; cast iron will wear. Steel will warp at braking temperatures and at the temperature of the clutch plate, whereas cast iron keeps its shape.

In purchasing cast iron the first requisite is a sound casting of good workmanlike appearance. It must have a certain amount of machinability and strength.The foundry must insist on castability, which requires a fairly high carbon content. Carbon and silicon have a fundamental influence on the properties of irons.

It is Professor Schneidewind's opinion that chemical specifications should be used sparingly and then only for classification. The physical properties are what really count in determining the usefulness of the castings. Castings cannot be broken up for tests, and test bars, of such a size that their cooling rates compare closely with that of the casting, should be used.

A.S.T.M. strength specifications for cast iron seem inadequate to Professor Schneidewind. The ratio of tensile strength to Brinell hardness will throw some light on quality and suitability of castings. A ratio of 180 to 200 is average. A ratio over 200 shows pretty fair foundry practice; one below 175 is questionable.

The transverse deflection is a poor second cousin to elongation in steel, but is to some extent a measure of toughness or lack of brittleness and a measure of the amount of plastic deformation cast iron will undergo before failure.

The graphite pattern is of extreme importance for wear resistance.

Too often the foundryman with better iron has to sell it to customers who do not appreciate its superiority.

Technical chairman was A. C. Denison, president of The Fulton Foundry & Machine Co., who led the group in an eager discussion which continued on even after the meeting was formally adjourned.

HELP WANTED

Address answers care of A. S. M., 7301 Euclid Ave., Cleveland, unless otherwise stated.

OPEN-HEARTH FOREMAN: Graduate metallurgist; prefer experience on acid steel. Age 35 to 45. Pittsburgh area. Might consider younger man with some experience. Salary open. Box 2-5.

CHIEF METALLURGICAL ENGINEER and two assistant metallurgists for specialty alloy steel plant. Broad technical as well as practical experience is absolutely essential. An excellent opportunity with a strong and very progressive company is presented for the right men. All communications will be held in strict confidence. Box 2-10.

New Employment Service Added to National Chain Maintained for Members

A new employment service has been added to the chain maintained by the Employment Counsellors Association of the U. S., whose services are available to the members of the Society. This is the Kinman Employment Service of Spokane, Wash.

The Technical Placement Service, 504 Swetland Bldg., Cleveland member of the Employment Counsellors Association, is national employment headquarters of the Society.

Members of the Society who are interested in securing a new position or firms who have a position open should communicate immediately with the nearest employment office. Each month especially desirable positions which come to the attention of headquarters will be listed in the Help Wanted column of THE REVIEW.

These employment offices (shown in the list below) are maintained to benefit the firm members as well as individual members of the Society, and companies having a position to be filled will find that these offices carry a select list of well-qualified A.S.M. technical men.

List of A.S.M. Employment Offices

AKRON, OHIO
Merrill D. Wright
Central Vocational Bureau
203 Buckeye Bldg.

ATLANTA, GEORGIA
A. H. Benton
Personnel Service Co.
Mortgage Guarantee Bldg.

BALTIMORE, MARYLAND
H. C. Clodi
Personnel Service Co.
1095 Lexington Bldg.

BUFFALO, NEW YORK
E. F. Dean
Dean Employment Service
Brisbane Bldg.

CHICAGO, ILLINOIS
Bert L. Parsons
Consolidated Agencies, Inc.
209 South State Street

CINCINNATI, OHIO
E. A. Cost
Progressive Placement Service
306 Schmidt Bldg.

CLEVELAND, OHIO
T. G. Protheroe
A. R. Bradley
Technical Placement Service
504 Swetland Bldg.

COLUMBUS, OHIO
Harry C. Vaughn
Harry C. Vaughn & Associates
36th Floor, A.I.U. Bldg.

DALLAS, TEXAS
E. M. & Claude Karr
Karr Employment Service
Republic Bank Bldg.

DAYTON, OHIO
Allen G. Banks
Banks-Mitchell Employment Service
304 Keith Bldg.

DENVER, COLORADO
B. L. Johnson
Business Men's Clearing House
Midland Savings Bldg.

DETROIT, MICHIGAN
George M. Millar
George M. Millar Employment Service
National Bank Bldg.

HARTFORD, CONNECTICUT
Emory L. Wolfe
Personnel Service Bureau, Inc.
720 Main Street

INDIANAPOLIS, INDIANA
Ancil T. Brown
Brown Efficiency Bureau
806 Guaranty Bldg.

KANSAS CITY, MISSOURI
T. DeWitt Hughes
Western Employment Counselors Assn., Inc.
707 Sharp Bldg.

LOS ANGELES, CALIFORNIA
Fred M. Smith
Pacific Audit & System Co., Inc.
711 Story Bldg.

MEMPHIS, TENNESSEE
Shapiro Positions Exchange
Union Planters Bank Bldg.

MILWAUKEE, WISCONSIN
R. J. Willetts
National Clerical Bureau
6069 Plankinton Bldg.

MINNEAPOLIS, MINNESOTA
W. A. Gilman
James Ells Service
929 Plymouth Bldg.

NASHVILLE, TENNESSEE
Murray E. Hill
Murray E. Hill & Associates
Third National Bank Bldg.

NEW ORLEANS, LOUISIANA
O. F. West
Commercial Employment Agency
713 Canal Bank Bldg.

NEW YORK, NEW YORK
Albert H. Rohrer
Acorn Employment Service, Inc.
63 Park Row

OAKLAND, CALIFORNIA
Harry B. Smith
Pacific Audit & System Co., Inc.
1419 Broadway

OMAHA, NEBRASKA
Harry H. Knapp
Western Reference & Bond Assn.
834 Redick Tower

PEORIA, ILLINOIS
Harold S. Taes
Taes Employment Agency
405 Main Street

PHILADELPHIA, PA.
J. D. Stephens
Business Service Co.
1600 Walnut Street

PITTSBURGH, PA.
E. C. Coby
Coby Service Bureau
Bessemer Bldg.

SAN ANTONIO, TEXAS
George T. Ferris
George T. Ferris Service
210 Gunter Office Bldg.

SAN FRANCISCO, CALIF.
Harry B. Smith
Pacific Audit & System Co., Inc.
57 Post Street

SPOKANE, WASH.
J. I. Kinman
Kinman Employment Service
110 Howard St.

ST. LOUIS, MISSOURI
E. T. Hasselbring
Business Service Co.
16th Floor, Chemical Bldg.

SYRACUSE, NEW YORK
R. E. Taylor
Taylor Employment
333 South Warren St.

TOLEDO, OHIO
E. Siefke
Toledo Personal Service Co.
1125 Edison Bldg.

WASHINGTON, D. C.
A. C. Wright
Boyd Employment Service
1333 F. Street, N. W.

Ernst's Hollywood Hit Cuts Great Figure

By Fred P. Peters

New Jersey Chapter — Occasionally we hear that the seat of the motion picture industry may in time be shifted from its present overstuffed resting place in California to the New York district.

Evidently the movement is under way and has already reached Cincinnati, for the Cincinnati Milling Machine Co.'s production "Metal Cutting" (also called "Death Comes to the Arch-Villain, 'Built-up Edge'") is definitely a four-star hit.

The movie was directed by Hans Ernst of that company, who also presented the sound continuity in person on the occasion of the picture's showing to the New Jersey Chapter at the Essex House, Newark, on Jan. 15.

The presentation was volubly characterized, with rare originality, as "colossal", "stupendous", "magnificent", "cutting", "incisive", moving" and "dynamic" by the audience, ordinarily reserved to the point of somnolency.

This research on the physics of metal cutting has been adequately reviewed in previous issues of this paper. Started 12 or 13 years ago on an entirely mechanical basis, it has developed (or degenerated, if that's your attitude) into a study of molecular chemistry of cutting fluids.

So far, the results have great potential practical value. May the unfinished work on cutting fluids continue to a happy conclusion, for, whatever they cost, the results are certain to be chip at half the price!

Worcester Lecture Course Covers Various Subjects

Worcester Chapter is sponsoring another series of lectures of an educational nature starting on March 4 and continuing for five consecutive Monday nights. They are free to anyone interested in registering for the course.

The Educational Committee, under the leadership of Chairman Richard F. Harvey, has arranged the following series of meetings:

Mar. 4—General Discussion of Steel; G. B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology.

Mar. 11—Some Experiences With Powder Metallurgy; Edward Van der Pyl, Norton Co.

Mar. 18—Induction Heating; W. E. Benninghoff, manager, Tocco Division of the Ohio Crankshaft Co.

Mar. 25—Metals Vs. Plastics; Allan A. Bates, manager, chemical and metallurgical dept., Westinghouse Electric & Mfg. Co.

Apr. 1—Seeing Stresses in Machine Parts; Prof. M. Lawrence Price, Worcester Polytechnic Institute.

CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Baltimore	Mar. 18	Engineers Club	L. C. Conradi	Local Heat Treatment of Office Machine Parts by Flame Hardening and High Frequency Induction
Boston	Mar. 1	Boston Gear Works	W. R. Frazer	Metallurgical Control in Tool Manufacture
Buffalo	Mar. 14	Hotel Buffalo	John Chipman	Physical Chemistry of Steel Making
Calumet	Mar. 20	Woodmar Country Club, Hammond, Ind.	C. W. Briggs	Manufacture and Testing of Steel Castings
Canton-Mass.	Mar. 14	Hotel Onesta	O. A. Schaefer	Large Forgings
Chicago	Mar. 14	Towers Club	S. C. Massari	New Developments in Cast Irons
Cincinnati	Mar. 14	University of Cincinnati	George M. Enos	Carburizing
Cleveland	Mar. 4	Cleveland Club	Zay Jeffries	Metals and Metallurgy in Rapid Evolution
Columbus	Mar. 12		Geo. M. Enos	Visual Examination of Steels
Dayton	Mar. 13	Engineers Club	George M. Enos	Carburizing
Detroit	Mar. 11	Fort Shelby Hotel	R. S. Dean	Electrolytic Manganese and Its Alloys
Hartford	Mar. 12	Hartford Electric Light Co. Auditorium	R. R. Moore	Metallurgy of Aircraft Materials
Indianapolis	Mar. 18	Washington Hotel	A. E. Focke	Equilibrium Diagrams
Los Angeles	Mar. 18	Scully's Cafe	E. C. Bain	
Milwaukee	Mar. 19	Milwaukee Athletic Club	Jerome Strauss	Metallurgical Applications of Vanadium
Montreal	Mar. 4	Windsor Hotel	R. H. Waddington	Production of Copper and By-Product Metals From Sudbury District Nickel Deposits
Montreal	Mar. 9	Windsor Hotel		Annual Stag Banquet
New Haven	Mar. 21	Derby Gas & Electric Co. Auditorium	Louis L. Stott	Beryllium Alloys
New Jersey	Mar. 18	Essex House, Newark	W. R. Frazer	Heat Treatment of High Speed Steel Tools
New York	Mar. 11	Bldg. Trade Employers Assoc. Clubrooms	A. W. Winston	Present Trend in Magnesium Alloys
North West	Mar. 13	Minnesota Union, Univ. of Minn.	E. F. Davis	Gears
Notre Dame	Mar. 13	Univ. of Notre Dame	E. E. Thum	What Makes Quenched Steel so Soft?
Ontario	Mar. 1	Toronto	R. M. Burns	Protective Metallic Coatings
Oregon	Mar. 5	Lloyd's Golf Club	E. C. Bain	
Oregon	Mar. 20	Public Service Bldg. Auditorium	James T. Kemp	
Penn State	Mar. 7		C. E. Swartz	Bearing Metals
Peoria	Mar. 4	Caterpillar Tractor Co.	F. B. Smith	Quality Control
Peoria	Mar. 11	Caterpillar Tractor Co.	P. C. Cunnick	Inspection and Quality Control of the Rock Island Arsenal
Peoria	Mar. 18	Caterpillar Tractor Co.	F. C. Parks	Selecting Men of Mettle for Aviation
Philadelphia	Mar. 29	Engineers Club	Alan Morris	Some Characteristics of Copper Alloys
Pittsburgh	Mar. 14			Young Fellows' Night
Puget Sound	Mar. 6	Gowman Hotel, Seattle	George Huck	Fatigue in Steel
Rhode Island	Mar. 6	Providence Engineering Society Bldg.	F. F. McIntosh	Magnetic Testing
Rochester	Mar. 11	Lower Strong Audit., Univ. of Rochester	John J. Vreeland	Welding of Copper and Its Alloys
Saginaw Val. Group	Mar. 19	Durant Hotel, Flint, Michigan	G. N. Sieger	Modern Welding
St. Louis	Mar. 15	York Hotel		Heat Treating Furnaces
Springfield	Mar. 18	Western Mass. Elec. Co. Auditorium	Hans Ernst	Researches in Metal Cutting
Syracuse	Mar. 12	Onondaga Hotel	V. O. Homerberg	Nitriding Process
Texas	Mar. 21	River Oaks Country Club	J. P. Gill	Modern High Speed Steels
Toledo Group	Mar. 25	Hillcrest Hotel	T. Archer	Metallurgy in the Petroleum Industry
Tri-City	Mar. 12	Rock Island Arsenal Audit.	J. P. Gill	20 Years of Tool Steel Metallurgy
Worcester	Mar. 21	Sanford Riley Hall, Wor. Polytech. Inst.	R. Burns George	Tool Steels and Their Best Treatment
York	Mar. 20	Waynesboro, Pa.	Hans Ernst	Machinability

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